N° 28,865 A.D. 1912

Date of Application, No. 28,865, 14th Dec., 1912
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Complete Specification Left, 13th June, 1913
(Section 16 of the Patents and Designs Act, 1907.)
Complete Specification Accepted, 11th Dec., 1913

PROVISIONAL SPECIFICATION.

No. 28,865, A.D. 1912.

Improvements in Wireless Telegraph Transmitters.

I, Guglielmo Marconi, LL.D., D.Sc., of Marconi House, Strand, London, W.C., do hereby declare the nature of this invention to be as follows:—

Our former Specification Number 4593 of 1907 describes a form of wireless telegraph transmitter in which the aerial circuit is coupled directly to a circuit comprising a condenser, an inductance and a spark gap from which the aerial receives an impulse once every half oscillation or every one and a half oscillations and so on.

The waves emitted from this aerial however were not always of the form best suited for wireless signalling and moreover harmonics of the ordinary wave were frequently emitted.

According to this invention I interpose between the aerial and the oscillating circuits of the transmitter described in Specification Number 4593 of 1907 a closed oscillating circuit of low damping which is in resonance with the aerial. This not only has the effect of improving the form of the wave and of stopping harmonics but it may receive an impulse at less frequent intervals than was formerly possible thus enabling the speed of the rotating discs and the frequency of the impulses therefrom to be considerably reduced.

Dated this Fourteenth day of December, 1912.

G. MARCONI.

PROVISIONAL SPECIFICATION.

No. 28,866, A.D. 1912.

Improvements in Wireless Telegraph Transmitters.

I, Guglielmo Marconi, LL.D., D.Sc., of Marconi House, Strand, London, W.C., do hereby declare the nature of this invention to be as follows:—

According to this invention I employ a source of current, which is preferably continuous and may advantageously be a high tension battery, in a circuit containing inductance, which circuit is with great rapidity and great frequency closed and opened by means of a revolving disc or discs provided with teeth so arranged as effectively to close and open a space or gap in the circuit.

The disc is mounted in such a manner that when one of its teeth passes one

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terminal of the circuit another tooth (preferably that diametrically opposite the first) passes the other terminal.

At each terminal also I arrange a powerful air blast to facilitate the breaking or interruption of the discharge.

When employing large amounts of electrical power I employ not one but two or more such discs insulated from each other, and I gear them together so that a tooth on one disc passes a tooth on the other disc at the instant that teeth are passing the terminals of the circuit, and I also preferably arrange air blasts at each gap to stop the discharge between the discs; or I may arrange a number of toothed discs mounted on the same shaft insulated from each other, and arranged to discharge on to contacts so disposed as to cause all the makes and all the breaks in the circuit to take place simultaneously and in series with each other.

The terminals or contact pieces to which the discharge passes are preferably made to move or revolve in such a manner as to avoid undue heating or burning.

By these means I am enabled to make and break the circuit with great rapidity.

Across the terminals of the battery or current generator I preferably place a condenser of suitable capacity in series with suitable inductances and resistances.

The circuit which is closed and interrupted I may couple to an aerial, but I prefer to couple it to a closed oscillation circuit containing inductance and capacity and this closed oscillation circuit I couple to the aerial.

By the employment of such an oscillating closed circuit I obviate the great loss of energy which would be entailed by the employment of a spark or discharge in the oscillating circuit.

The speed of rotation of the disc or discs should be such that the interval between the commencement of the discharges is equal to, or a multiple of, the natural time period of the aerial and of the closed circuit if such be used, so that the aerial or closed circuit receives impulses in synchronism with its natural period of electrical oscillation.

The apparatus may be arranged to transmit regular groups of oscillations instead of a continuous stream in which case the teeth of one or more of the discs are arranged in groups alternating with blank spaces: or a source of alternating current may be employed.

This arrangement of toothed discs in series can also be advantageously employed for the purpose of very greatly increasing the amount of electrical energy which can be efficiently utilised in the system described in Patent No. 4593 of 1907.

Dated this Fourteenth day of December, 1912.

G. MARCONI.

COMPLETE SPECIFICATION.

Improvements in Wireless Telegraph Transmitters.

I, GUGLIELMO MARCONI, LL.D., D.Sc., of Marconi House, Strand, London, W.C., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

According to this invention I employ a source of current which is preferably continuous and may advantageously be a high tension battery, in a circuit containing inductance, which circuit is with great rapidity and great frequency closed and opened by means of a rotating disc or discs provided with teeth so arranged as effectively to close and open a space or gap in the circuit.

The disc is mounted in such a manner that when one of its teeth passes one terminal of the circuit another tooth (preferably that diametrically opposite the first) passes the other terminal.

Figure 1 of the accompanying drawing shows diagrammatically this arrangement in its simplest form.

a is a high tension battery in a circuit containing an inductance *b* and having terminals *c* c^1 between which is mounted an insulated metal disc *d* having on its periphery teeth or studs *e* and provided with means for rapidly rotating it. *f* is an aerial conductor or antenna coupled to the first circuit.

At one or both of the terminals *c* c^1 I arrange a powerful air blast, a rectifier or quenching gaps to facilitate the breaking or interruption of the discharge.

When employing large amounts of electrical power I employ not one but two or more discs insulated from each other and I gear them together so that a tooth on one disc passes a tooth on the other disc at the instant that teeth are passing the terminals of the circuit.

This arrangement is shown in Figure 2 which is similar to Figure 1 except that three discs *d* d^1 d^2 are shown in place of one, the gearing being omitted. I preferably arrange air blasts, rectifiers or quenching gaps at the points *g* g^1 between the discs as well as at the terminals *c* c^1 to stop the discharge.

Or I may mount on a single shaft a number of toothed discs insulated from each other, and arranged to discharge on to contacts so disposed as to cause all the makes and all the breaks in the circuit to take place simultaneously and in series with each other.

This arrangement is shown in Figure 3 which is an edge view of three discs mounted on a single shaft; the discharge passes from terminal *c* to disc *d*, a contact *h*, then to disc d^1, a contact h^1, disc d^2 and then to terminal c^1.

As before means may be provided at one or more of the points *c* *h* h^1 c^1 for stopping the discharge.

In all cases the terminals *c* c^1 and contact pieces *h* h^1 by which the discharge passes are preferably made to move or revolve in such a manner as to avoid undue heating or burning.

In all the foregoing cases also the time during which the circuit is completed by the disc or discs should be as nearly as possible equal to one half the natural time period of the aerial circuit; this can be effected by suitably arranging the terminals and the speed of rotation of the disc or discs.

Across the terminals of the battery or current generator in any of these arrangements I preferably place a condenser of suitable capacity in series with suitable inductances and resistances and the condenser and inductance *b* should be such that the natural time period of the circuit containing them is equal to that of the aerial circuit.

Devices may be inserted for rectifying or quenching the oscillations in the condenser discharge circuit.

Figure 4 shows this circuit which is similar to that described in Specifications Nos. 20,119 of 1907 and 18,524 of 1909, *i* being inductances which may have also resistance and *j* a condenser.

Preferably however in all the above arrangements and in order to make the oscillations in the aerial more uniform in place of coupling the aerial directly to the generator circuit I couple it to a closed oscillation circuit containing inductance and capacity and this closed oscillation circuit I couple to the generator circuit as shown in Figure 5.

This closed oscillation circuit not only has the effect of improving the form of the wave and of stopping harmonics but it may receive an impulse at less frequent intervals than was formerly possible thus enabling the speed of the rotating discs and the frequency of the impulses therefrom to be considerably reduced.

In every case the speed of rotation of the disc or discs should be such that the interval between the commencement of successive discharges is equal to, or a multiple of, the natural time period of the aerial and of the closed circuit if such be used, so that the aerial or closed circuit receives impulses in synchronism with its natural time period and thus continuous oscillations are produced in the aerial.

A closed oscillation circuit which is in tune with the aerial circuit may also be interposed between the aerial circuit and the oscillating circuit described in Specification No. 4593 of 1907 in which case the speed of rotation of the discs should be such that the interval between successive discharges is equal to or an odd multiple of half the natural time period of the aerial circuit.

This arrangement is illustrated in Figure 6.

In any of these arrangements if it be desired to transmit regular groups of oscillations instead of a continuous stream the teeth of one or more of the discs may be arranged in groups alternating with blank spaces, or a source of alternating current may be employed.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. The production of continuous oscillations in an aerial circuit by means of a circuit containing a source of current and an inductance but no condenser and one or more rotating toothed discs so arranged that they close the circuit periodically and in synchronism with the oscillations of the aerial circuit substantially as described.
2. The production of continuous oscillations in an aerial circuit by means of a condenser circuit tuned to the aerial and containing one or more toothed disc dischargers which are so arranged that the time between the commencement of successive discharges is equal to or a multiple of the natural time period of the aerial substantially as described.
3. In the method of producing continuous oscillations in an aerial circuit which is claimed in Claim 1 or Claim 2, the employment of an intermediate oscillating circuit tuned to the aerial circuit substantially as described.
4. The combination with an aerial circuit and an oscillating circuit described in Specification No. 4593 of 1907 of an intermediate oscillating circuit in tune with the aerial circuit substantially as described.

Dated this 6th day of June, 1913.

CARPMAEL & Co.,
Agents for Applicant,
24, Southampton Buildings, London, W.C.

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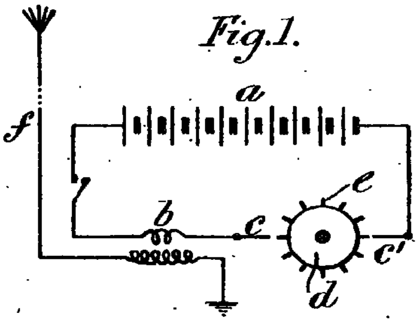
A.D. 1912. Dec. 14. No 28,865.

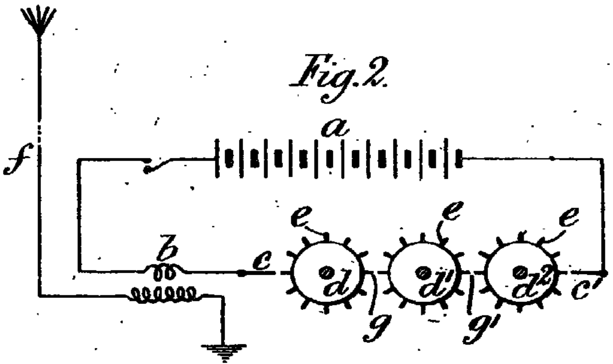
MARCONI'S Complete Specification.

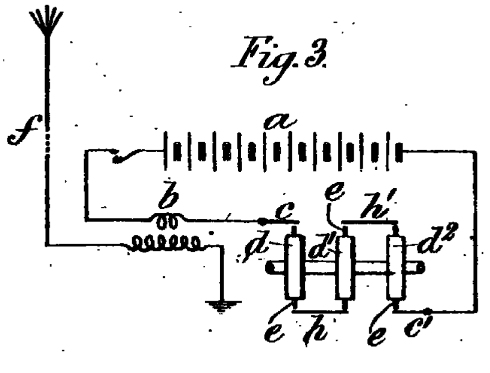
(2 SHEETS)

[This Drawing is a reproduction of the Original on a reduced scale]

SHEET 1.







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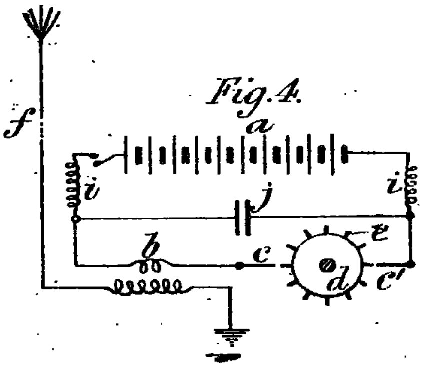

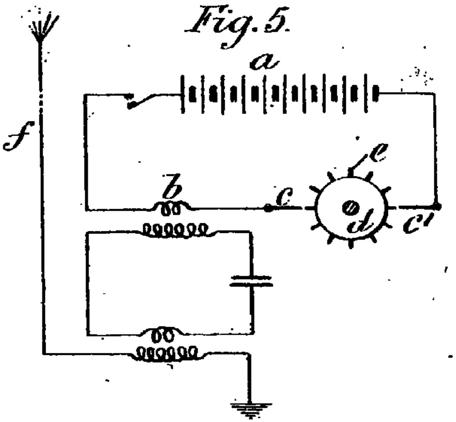

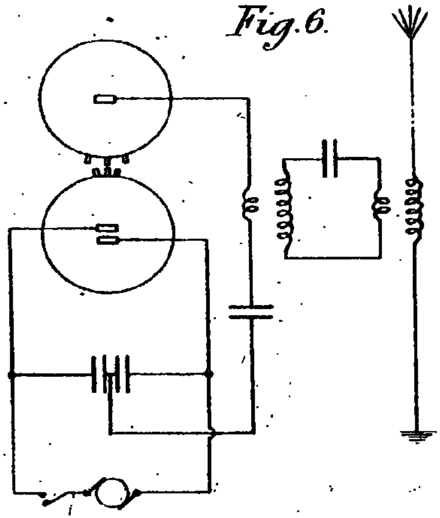

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